WHAT IS CLAIMED IS:

1. A connector apparatus for connecting an electrical cut-off (ECO) switch of a gas appliance in a series electrical circuit relationship between an electrical terminal of a thermocouple and an electrical terminal of an automatic pilot valve magnet, when the pilot valve magnet is mounted in a bore of a gas control valve, with the bore defining a central longitudinally extending axis thereof, the connector apparatus comprising:

a spacer adapted for installation into the bore between the pilot valve magnet and the thermocouple;

a connector adapted for engaging the spacer, and having first and second axially spaced electrical contacts electrically insulated from one another, the first electrical contact being adapted for contacting the electrical terminal of the pilot valve magnet, and the second electrical contact being adapted for contacting the electrical terminal of the thermocouple; and

a retainer having an external thread on an outer periphery thereof for threadably engaging the bore and clamping the spacer against the pilot valve magnet, the retainer also having an internally threaded, axially oriented, through-hole therein for threadably receiving and retaining the thermocouple therein with the electrical terminal of the thermocouple in contact with the second electrical contact of the connector.

2. The connector apparatus of claim 1, wherein the retainer further comprises a cylindrically shaped annular insert of electrically insulative material disposed in the axially oriented through-hole at one end thereof, for providing a ring of electrical insulation between the electrical contact of the thermocouple and the retainer.

3. The connector apparatus of claim 1, wherein:

the bore of the gas control valve defines a generally cylindrical wall thereof having a window extending radially therethrough for passage of the connector; and

the connector is adapted for insertion in a radial direction, through the window and into engagement with the spacer.

4. The connector apparatus of claim 1, wherein:

the bore of the gas control valve defines a generally cylindrical wall thereof having a window extending radially therethrough for passage of the connector;

the window defines an edge thereof; and

the spacer includes one or more anti-rotation tabs extending radially outward therefrom for engaging the edge of the window, to thereby preclude rotation of the spacer in the bore as the retainer is threaded into contact with the spacer.

5. The connector apparatus of claim 1, wherein the spacer is generally cylindrically shaped, with a radially opening slot therein for receiving the connector.

6. The connector apparatus of claim 5, wherein the spacer includes a first and a second radially opening slot therein for receiving the connector, at opposite axial ends thereof and each opening toward a respective axial end of the spacer, to thereby allow the spacer to be installed in the bore with either the first or the second axial end thereof facing the retainer, and to thereby allow insertion of the connector into a desired one of the first or second radially extending slots, regardless of which of the first and second axial ends of the spacer is facing toward the retainer.

7. The connector apparatus of claim 5, wherein the connector includes locking tangs for engaging the radially opening slot in the spacer and retaining the connector in the slot.

8. The connector of claim 7, wherein the connector includes a generally planar shaped connector housing of electrically insulating material defining:

the locking tangs at one end of the connector housing;

a first and a second generally planar surface of the connector housing;

first and second contact receiving recesses in the first and second generally planar surfaces respectively, for receiving a first and a second ECO switch contact therein; and

one or more retaining bridges adjacent each of the first and second recesses for retaining the first and second ECO switch contacts in the first and second recesses.

9. The connector apparatus of claim 8, wherein the connector further comprises:

a first and a second ECO switch contact disposed in the first and second recesses respectively of the connector housing, each having a wire attached to a distal end thereof at an end of the connector housing opposite the locking tangs and defining barbs for engaging the connector housing and retaining the first and second ECO switch contacts in the recesses; and

a connector cover attached to the connector housing over the distal ends of the first and second ECO switch contacts.

10. A control apparatus for installation into a bore of a gas control valve of a gas appliance having an electrical cut-off (ECO) switch and a thermocople, where the bore of the gas control valve defines a central longitudinally extending axis thereof and the thermocouple includes an electrical terminal thereof, the control apparatus comprising:

an automatic pilot valve magnet, axially insertable into the bore and having a pilot valve magnet electrical terminal at an axial end thereof; and

a connector apparatus for connecting the ECO switch of the gas appliance in a series electrical circuit relationship between the electrical terminal of the thermocouple and the electrical terminal of the automatic pilot valve magnet, when the pilot valve magnet is mounted in a bore of a gas control valve, the connector apparatus comprising a spacer, a connector and a retainer;

the spacer being adapted for installation into the bore between the pilot valve magnet and the thermocouple;

the connector being adapted for engaging the spacer, and having first and second axially spaced electrical contacts electrically insulated from one another, the first electrical contact being adapted for contacting the electrical terminal of the pilot valve magnet, and the second electrical contact being adapted for contacting the electrical terminal of the thermocouple; and

the retainer having an external thread on an outer periphery thereof for threadably engaging the bore and clamping the spacer against the pilot valve magnet, the retainer also having an internally threaded, axially oriented, through-hole therein for threadably receiving and retaining the thermocouple therein with the electrical terminal of the thermocouple in contact with the second electrical contact of the connector.

11. The control apparatus of claim 10, wherein the retainer further comprises a cylindrically shaped annular insert of electrically insulative material disposed in the axially oriented through-hole at one end thereof, for providing a ring of electrical insulation between the electrical contact of the thermocouple and the retainer.

12. The control apparatus of claim 10, wherein:

the bore of the gas control valve defines a generally cylindrical wall thereof having a window extending radially therethrough for passage of the connector; and

the connector is adapted for insertion in a radial direction, through the window and into engagement with the spacer.

13. The control apparatus of claim 10 wherein:

the bore of the gas control valve defines a generally cylindrical wall thereof having a window extending radially therethrough for passage of the connector;

the window defines an edge thereof; and

the spacer includes one or more anti-rotation tabs extending radially outward therefrom for engaging the edge of the window, to thereby preclude rotation of the spacer in the bore as the retainer is threaded into contact with the spacer.

14. The control apparatus of claim 10, wherein the spacer is generally cylindrically shaped, with a radially opening slot therein for receiving the connector.

15. The control apparatus of claim 14, wherein the spacer includes a first and a second radially opening slot therein for receiving the connector, at opposite axial ends thereof and each opening toward a respective axial end of the spacer, to thereby allow the spacer to be installed in the bore with either the first or the second axial end thereof facing the retainer, and to thereby allow insertion of the connector into a desired one of the first or second radially extending slots, regardless of which of the first and second axial ends of the spacer is facing toward the retainer.

16. The control apparatus of claim 14, wherein the connector includes locking tangs for engaging the radially opening slot in the spacer and retaining the connector in the slot.

17. The control apparatus of claim 16, wherein the connector includes a generally planar shaped connector housing of electrically insulating material defining:

the locking tangs at one end of the connector housing;

a first and a second generally planar surface of the connector housing;

first and second contact receiving recesses in the first and second generally planar surfaces respectively, for receiving a first and a second ECO switch contact therein; and

one or more retaining bridges adjacent each of the first and second recesses for retaining the first and second ECO switch contacts in the first and second recesses.

18. The control apparatus of claim 17, wherein the connector further comprises:

a first and a second ECO switch contact disposed in the first and second recesses respectively of the connector housing, each having a wire attached to a distal end thereof at an end of the connector housing opposite the locking tangs and defining barbs for engaging the connector housing and retaining the first and second ECO switch contacts in the recesses; and

a connector cover attached to the connector housing over the distal ends of the first and second ECO switch contacts.

19. A gas control valve for an appliance having an electrical cut-off (ECO) switch and a thermocople, where the thermocouple includes an electrical terminal thereof, the gas control valve comprising:

a control valve housing having a bore therein, with the bore defining a central longitudinally extending axis thereof;

an automatic pilot valve magnet, axially insertable into the bore and having a pilot valve magnet electrical terminal at an axial end thereof; and

a connector apparatus for connecting the ECO switch of the gas appliance in a series electrical circuit relationship between the electrical terminal of the thermocouple and the electrical terminal of the automatic pilot valve magnet, when the pilot valve magnet is mounted in a bore of a gas control valve, the connector apparatus comprising a spacer, a connector and a retainer;

the spacer being adapted for installation into the bore between the pilot valve magnet and the thermocouple;

the connector being adapted for engaging the spacer, and having first and second axially spaced electrical contacts electrically insulated from one another, the first electrical contact being adapted for contacting the electrical terminal of the pilot valve magnet, and the second electrical contact being adapted for contacting the electrical terminal of the thermocouple; and

the retainer having an external thread on an outer periphery thereof for threadably engaging the bore and clamping the spacer against the pilot valve magnet, the retainer also having an internally threaded, axially oriented, through-hole therein for threadably receiving and retaining the thermocouple therein with the electrical terminal of the thermocouple in contact with the second electrical contact of the connector.

20. The gas control valve of claim 19 wherein the retainer further comprises a cylindrically shaped annular insert of electrically insulative material disposed in the axially

oriented through-hole at one end thereof, for providing a ring of electrical insulation between the electrical contact of the thermocouple and the retainer.

21. The gas control valve of claim 19, wherein:

the bore of the gas control valve defines a generally cylindrical wall thereof having a window extending radially therethrough for passage of the connector; and

the connector is adapted for insertion in a radial direction, through the window and into engagement with the spacer.

22. The gas control valve of claim 19, wherein:

the bore of the gas control valve defines a generally cylindrical wall thereof having a window extending radially therethrough for passage of the connector;

the window defines an edge thereof; and

the spacer includes one or more anti-rotation tabs extending radially outward therefrom for engaging the edge of the window, to thereby preclude rotation of the spacer in the bore as the retainer is threaded into contact with the spacer.

23. The control valve of claim 19, wherein:

the spacer is generally cylindrically shaped, with a radially opening slot therein for receiving the connector; and

the connector includes locking tangs for engaging the radially opening slot in the spacer and retaining the connector in the slot.

24. The control valve of claim 19, wherein the connector comprises:

a connector housing, a first and a second ECO switch contact each having a wire attached thereto at a distal end thereof, and a connector cover;

the connector housing being generally planar shaped, formed of an electrically insulating material, and defining the locking tangs at one end thereof, a first and a second generally planar surface thereof, first and second contact receiving recesses in the first and second generally planar surfaces respectively, and one or more retaining bridges adjacent each of the first and second recesses for retaining the first and second ECO switch contacts in the first and second recesses;

the first and second ECO switch contacts being disposed in the first and second contact receiving recesses respectively of the connector housing, with the distal ends thereof disposed at an end of the connector housing opposite the locking tangs;

the first and second ECO switch contacts also each defining barbs for engaging the connector housing and retaining the first and second ECO switch contacts in the contact receiving recesses; and

the connector cover being attached to the connector housing over the distal ends of the first and second ECO switch contacts.